

An extraordinary new termite (Isoptera: Termitidae: Syntermitinae: *Rhynchotermes*) from the pasturelands of northern Colombia

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Abstract

A new species of mandibulate nasute termite, *Rhynchotermes bulbinasus* Scheffrahn sp. nov. is described from dimorphic soldiers and monomorphic workers discovered in the Caribbean plains of northern Colombia. The new species differs from all other New World Syntermitinae and Nasutitermitinae, in having a nasus with its distal diameter greater than its median diameter. Literature on the genus *Rhynchotermes* Holmgren is reviewed and field observations of *R. bulbinasus* are given.

Key words: Isoptera: Termitidae: Syntermitinae, Neotropical, Colombia, Caribbean Basin, cattle pastures, new species, taxonomy

Introduction

The termite subfamily Syntermitinae Engel and Krishna 2004 consists of thirteen Neotropical genera all with mandibulate nasute soldiers. The most striking of these genera is *Rhynchotermes* Holmgren 1912. *Rhynchotermes* soldiers are most easily recognized by the following character combinations: sharp and strongly curved mandibles, a rather long and cylindrical or conical nasus, and a pointed projection on each fore coxa. Holmgren (1912) first established the genus *Rhynchotermes* from *Armitermes nasutissimus* Silvestri 1901 collected in Brazil and Paraguay. Snyder (1949) raised his Central American species, *Armitermes (Rhynchotermes) perarmatus* Snyder 1925a to *Rhynchotermes* and synonymized *Armitermes (Rhynchotermes) major* Snyder 1925b with *R. perarmatus*. Mathews (1977) redescribed both the genus *Rhynchotermes* and Silvestri's *R. nasutissimus* and added two new species from Brazil, *R. nyctobius* and *R. diphyes*. Fontes (1985) included a key for the former four species noting that the minor soldiers of *R. nyctobius* and *R. diphyes* were difficult to distinguish without the major soldiers. Finally, Cancello (1997) described two additional species from Brazil, *R. guarany* and *R. piauy*, thus raising the number of *Rhynchotermes* species to six. Herein, I describe the most distinguishable of all *Rhynchotermes* species, possibly the most distinguishable of all nasute taxa, *R. bulbinasus* sp. nov.

Material and methods

Specimens of *Rhynchotermes bulbinasus* sp. nov. were collected along roadsides in the northern Colombian districts of Sucre, Bolívar, and Atlántico during 2–4 June 2009 (Fig. 1). Laboratory images (Figs. 2–6) of preserved specimens in 85% ethanol were made using an Olympus SZX9 stereomicroscope fitted by a LM Scope camera tube to an Olympus E-410 digital camera. A field photograph of live termites (Fig. 7) was taken with a Nikon Coolpix S7c digital camera set to macro and flash mode. Morphological terminology follows that of Sands (1965) and Roonwal (1969).



FIGURE 1. Known distribution of *Rhynchotermes bulbinasus*, sp. nov. Red circles are survey sites where *R. bulbinasus* was collected. Blue circles represent survey sites where termites were collected but where *R. bulbinasus* was not found.

***Rhynchotermes bulbinasus* Scheffrahn sp. nov.
(Figs. 2–6)**

Description. Imago: unknown

Soldier (Figs. 2–4). Dimorphic; both soldier forms nearly identical except for relative proportions. Major and minor soldier ratios approximately equal in foraging groups collected. Head capsule orange or ferruginous orange except darker at base of nasus. Inflated apical portion of nasus concolorous with or lighter than head capsule and much lighter than its base. Noticeable range of head capsule pigmentation among soldiers with small proportions orange-yellow or chestnut brown.

Head capsule hemispherical. Nasus projecting well beyond mandibles; basal one-third narrow, gradually increasing in diameter beyond 1/3 length to a maximum at about 2/3 length, then gradually decreasing at tip to less than basal diameter. Diameter of nasus at 2/3 length about 50% greater than narrowest basal diameter. Nasus hollow, thickness of outer wall even. Nasus circular in cross-section throughout. Pilosity of head capsule marked by two longer setae and usually six shorter setae, spaced bilaterally; longer setae on vertex above plane of nasus, shorter setae below plane of nasus. Nasus without setae.



FIGURES 2–5. *Rhynchotermes bulbinasus*, sp. nov. 2, dorsal habitus of minor (top) and major soldiers (bar = 1 mm); 3, lateral view of minor soldier; arrow points to process on fore coxa (bar = 1 mm); 4, ventral view of head of minor soldier (bar = 0.5 mm); 5, dorsal and lateral habitus of mature workers (bar = 1 mm).

Mandibles curved ~160–190° with greatest curvature beyond marginal tooth. Mandibles narrowing beyond marginal teeth. Marginal teeth exceptionally long and narrow; apical and marginal teeth extremely thin and sharp. When completely closed, mandibles do not superimpose but close further, overlapping near marginal teeth. Antennae very long, nearly twice the length of the nasus; 14 articles, 2<3>4<5=6. Process on fore coxa narrowly triangular, sharp, and projecting forward. All legs long; hind legs longest.

Anterior lobe of pronotum with steep upturn giving appearance of dark notches on each side; posterior emarginate. Meso- and metanotum with two lateral tubercles; tergites also with smaller, less sclerotized lateral tubercles arranged in a row along tergum.

Major soldier ($n = 9$, 3 each from paratype colonies; mean \pm SD (range) in mm): head length with nasus 2.02 ± 0.084 (1.93–2.20); maximum head width 0.96 ± 0.067 (0.89–1.09); left mandible maximum length 0.79 ± 0.035 (0.74–0.84); nasus length 1.19 ± 0.054 (1.11–1.26); nasus width at narrowest basal diameter 0.14 ± 0.011 (0.12–0.15); nasus width at widest apical diameter 0.20 ± 0.014 (0.17–0.22); maximum pronotum width 0.57 ± 0.032 (0.52–0.62); fore tibia length 1.02 ± 0.048 (0.96–1.11); hind tibia length 1.26 ± 0.041 (1.21–1.36).

Minor soldier: ($n = 9$, 3 each from paratype colonies; mean \pm SD (range) in mm): head length with nasus 1.84 ± 0.068 (1.74–1.93); maximum head width 0.84 ± 0.070 (0.75–0.99); left mandible maximum length 0.72 ± 0.058 (0.64–0.81); nasus length 1.11 ± 0.030 (1.06–1.16); nasus width at narrowest basal diameter

0.12 ± 0.0081 (0.10–0.12); nasus width at widest apical diameter 0.18 ± 0.012 (0.16–0.20); maximum pronotum width 0.51 ± 0.016 (0.48–0.53); fore tibia length 0.98 ± 0.026 (0.93–1.01); hind tibia length 1.16 ± 0.025 (1.14–1.21).

Worker (Figs. 5–6). Monomorphic, slightly larger than soldiers. Head capsule ferruginous orange but with noticeable range of pigmentation from orange-yellow or chestnut brown. Head capsule with about eight longer setae and a few shorter setae evenly spaced; two longer pairs visible in lateral view. Antennae with 14 articles $2 < 3 > 4 = 5$. Forecoxa with pointed rise in anterior margin. Enteric valve weakly armed, transition between P1 and P3 defined primarily by constriction of cuticular lining of P2; enteric valve contains three weakly defined pads, each with 12–16 very small triangulate spines. Worker maximum head width ($n = 9$, 3 each from 3 paratype colonies; mean \pm SD (range): $1.11\text{mm} \pm 0.031$ (1.06–1.15).

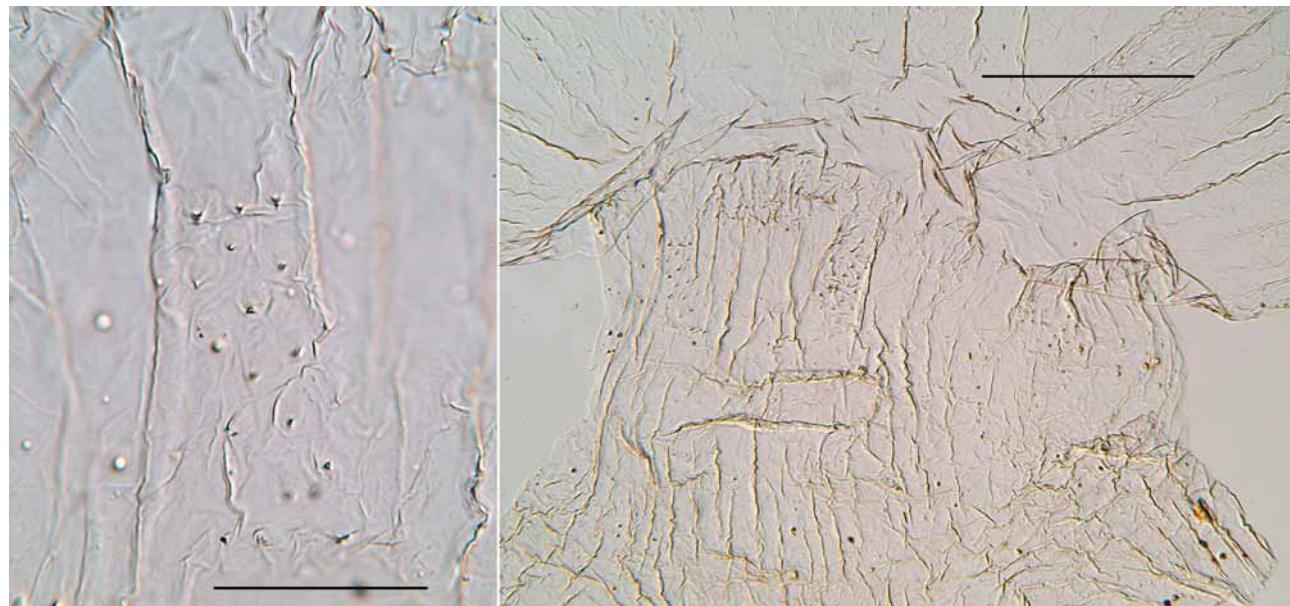


FIGURE 6. Enteric valve lining of *R. bulbinasus*, sp. nov. worker. Single enteric valve pad on left (bar = 0.05 mm), entire valve on right (bar = 0.2 mm).

Diagnosis. *Spatulitermes coolingi* Coaton 1971 (Nasutitermitinae), a monotypic genus, is the only nasute termite species in the world other than *R. bulbinasus*, that I am aware of, that has a basally constricted nasus. Unlike *R. bulbinasus*, the nasus base in the non-mandibulate *S. coolingi*, in the dorsal aspect, is only slightly narrower at about one fifth of its length than at its widest distal point. In Coaton's 1971 lateral drawing of the *S. coolingi* soldier head, there is no constriction, suggesting that the nasus is constricted laterally (*R. bulbinasus* constricted dorsoventrally and laterally) suggestive of an oval, laterally compressed, cross section.

To include *R. bulbinasus*, the key to *Rhynchotermes* by Fontes (1985) would require the addition of a new opening couplet that divides the genus by nasus shape: bulbous for *R. bulbinasus*, cylindrical for *R. perarmatus*, and conical for the remaining species separated in the second couplet.

Material Examined. Holotype: major soldier, Buenavista (9.31454, -75.02857), Departamento de Sucre, Colombia, 2 June 2009, elev. 113 m, under cow dung with many other soldiers and workers, J. Chase, col. (UF code CO-270). Three paratype colonies from Buenavista and Sincelejo (Dept. Sucre, CO-270 and CO-294 respectively), and E. Arjona (Dept. Bolívar, CO-366). The type and paratypes are deposited in the University of Florida Termite Collection (Ft. Lauderdale Research and Education Center, Fort Lauderdale, Florida). Additional paratypes will be deposited in the Florida Collection of Arthropods (Florida Department of Agriculture and Consumer Services, Division of Plant Industry, Gainesville, Florida), and the Arthropod Collection of the Instituto Alexander von Humboldt, Villa de Leyva, Boyacá, Colombia. All samples of *R. bulbinasus* were collected at 4–408 m elevation from the following 11 localities in Colombia's Caribbean lowlands (Fig. 1): Lomas La Querella (9.31634, -74.90079), 2JUNE09; Buenavista (9.31454, -75.02857), 2JUNE09; Sincelejo (9.37762, -75.43309), 2JUNE09; Coveñas (9.45451, -75.61294), 2JUNE09; E. Arjona

(10.09793, -75.15652) 3JUNE09; N.W. San Jacinto (9.86610, -75.15836) 3JUNE09; N.W. San Jacinto loc. 2 (9.85384, -75.15276) 3JUNE09; Cienega e Ortiz (10.15187, -75.04366) 3JUNE09; Salamina (10.48548, -74.84011) 3JUNE09; Sabanalurga (10.64813, -74.91391) 4JUNE09; Clemencia (10.57234, -75.33540) 4JUNE09. All samples collected by the author and those mentioned in the acknowledgments.



FIGURE 7. *In situ* image of *R. bulbinasus*, sp. nov. soldiers and workers on open soil surface about 4 hours after sunrise. Notice high stance and position of stationary soldiers as they guard moving workers in the background.

Etymology. This species is named for the striking shape of the soldiers' nasus (further complemented by its bicoloration).

Biology. All colony samples of *R. bulbinasus* were collected in cattle pastures, pasture boundary vegetation, and marginal disturbed grazed vegetation adjacent to pastures. These pasturelands are dominated by *Amitermes foreli* Wasmann which builds conical earthen mounds. Some species of *Heterotermes*, *Microcerotermes*, and *Nasutitermes*, common in disturbed habitats, are also sympatric with *R. bulbinasus*. The abundance of *R. bulbinasus* in pasturelands suggests that populations of this species are well suited, and may even be flourishing in cleared and cattle-grazed areas. This may be the first new termite species immediately field-confirmed by digital macrophotography.

Foraging groups of *R. bulbinasus* were collected under aged cow dung on which they were feeding or under stones that covered underground galleries. In one case, *R. bulbinasus* was inhabiting an abandoned mound of *A. foreli*. This habit of *Rhynchotermes* colonizing the nest of another termite species was also noted by Cancello (1997). Where leaf litter was present, diurnal open foraging was observed. One large column of foragers was seen emerging from a hole on the soil surface that was covered with an arcade about 1.5-cm wide and 15-cm long. The foraging workers crawled into the open air at the end of the arcade to gather pieces of litter and then return into the arcade entrance. Stationary soldiers guarded the trail of workers. Soldiers were positioned in an exceptionally tall stance with mandibles completely opened (Fig. 7). When disturbed, soldiers emitted a very viscous and sticky defensive secretion which covered the bulbous portion of the nasus. When soldiers were aspirated and transferred to a Petri dish for photography, debris was observed adhering to their nasi. Unlike that of *Nasutitermes*, the *R. bulbinasus* secretion does not eject from the nasus nor does it dissolve in the preserving ethanol. The disturbance and comingling caused by termite collection and preservation resulted in soldiers biting workers, each other, and species collected together (usually soldierless termites). The sharp mandibles easily penetrated head capsules of nest mates and heterospecifics as seen in preserved material.

The discovery of this unusually striking, yet rather common new termite species is further evidence that undiscovered macrobiodiversity not only resides in remote, pristine habitats, but may be as close as a cow pasture on the side of a highway.

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References

Cancello, E.M. (1997) *Rhynchotermes guarany*, new species and *Rhynchotermes piauy*, new species (Isoptera: Termitidae: Nasutitermitinae) from Brazil. *Papéis Avulsos de Zoologia*, 40, 147–159.

Coaton, W.G.H. (1971) Five new termite genera from south west Africa (Isoptera: Termitidae). *Cimbobasia*, 2, 1–34.

Engel, M.S. & Krishna, K. (2004) Family-group names for termites (Isoptera). *American Museum Novitates*, 3432, 1–9.

Fontes, L.R. (1985) New genera and new species of Nasutitermitinae from the Neotropical Region (Isoptera, Termitidae). *Revista Brasileira de Zoologia, São Paulo*, 3, 7–25.

Holmgren, N. (1912) Termitenstudien 3. Systematic der termiten. die familie Metatermitidae. *Kungliga Svenska Vetenskapsakademiens*, 48, 1–166.

Mathews, A.G.A. (1977) Studies on termites from the Mato Grosso state, Brazil. *Rio de Janeiro: Academia Brasileira de Ciências*, 267 pp.

Roongwal, M.L. (1969) Measurement of termites (Isoptera) for taxonomic purposes. *Journal of the Zoological Society of India*, 21, 9–66.

Sands, W.A. 1965. A revision of the termite subfamily Nasutitermitinae (Isoptera, Termitidae) from the Ethiopian Region. *Bulletin of the British Museum (Natural History). Entomology (Suppl.)*, 4, 1–172.

Silvestri, F. (1901) Nota preliminare sui termitid Sud-Americanini. *Bollettino dei Musei di Zoologia e Anatomia Comparata della Università Torino*, 26, 1–8.

Snyder, T.E. (1925a) New termites and hitherto unknown castes from the canal zone, Panama. *Journal of Agricultural Research*, 29, 179–193.

Snyder, T.E. (1925b) New American termites including a new subgenus. *Journal of the Washington Academy of Science*, 15, 152–162.

Snyder, T.E. (1949) Catalog of the termites (Isoptera) of the world. *Smithsonian Miscellaneous Collections*, 112, 1–490.